CSC/DSC 462 - A Computational Introduction to Statistics - FALL 2018

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LECTURES: TTh 2:00 PM-3:15 PM; LCHAS 141

OFFICE HOURS: TBA

PREREQUISITE: Discrete mathematics; Introductory calculus (equivalent to MTH 150 or MTH 150A; and MTH 142 or MTH 161 or MTH 171).

PRIMARY TEXTS:

1. Lecture notes provided by instructor. Available from course website.
2. *An Introduction to R.* William N. Venables, David M. Smith.
   Available at https://cran.r-project.org/doc/manuals/r-release/R-intro.pdf

RECOMMENDED TEXTS: (earlier editions are fine)

1. *Introduction to Probability Models* (12th Edition). Sheldon M. Ross. Academic Press.
2. *Probability and Statistics for Engineering and the Sciences* (9th Edition). Jay L. Devore. Brooks/Cole
3. *Probability and Statistics for Computer Science*. James L. Johnson. Wiley.
4. *Modern Applied Statistics with S* (4th Edition) by W.N. Venables and B.D. Ripley, Springer

SOFTWARE: Students are advised to install the R statistical computing environment. The latest version is currently 3.5.1. This is available at https://www.r-project.org/ as free software under the terms of the Free Software Foundation's GNU General Public License in source code form. Precompiled binary distributions are also available for Windows, MAC OS X, and Linux OS (versions of archived precompiled distributions vary). An introductory manual is listed above as a primary text.

COURSE WEBSITE: Course material and announcements will be posted on *Blackboard* at https://learn.rochester.edu/. Registered students should already be enrolled in *Blackboard*.

COURSE MATERIAL: This course will cover foundational concepts in probability and statistical inference, with an emphasis on topics of interest to computer scientists. Following an introduction to elementary probability theory, topics will include applications of combinatorics; Poisson processes; Markov processes; principles of statistical classification (Bayes' rule, sensitivity and specificity, ROC curves) and random number generation. The theory of statistical estimation and hypothesis testing will be introduced, and applied to one and two sample inference for population means, proportions, variances and correlations. Nonparametric procedures will be discussed. Topics also include statistical modeling (ANOVA, simple and multiple regression), and computational methods. Students will be introduced to the R statistical computing environment.

GRADING: There will be homework assignments (generally every 2 weeks), a midterm examination, and a final examination, constituting 35%, 25%, and 40% of the course grade, respectively.

ACADEMIC INTEGRITY: Undergraduate and graduate education at Rochester builds on the principle that excellence is achieved by exercising freedom in our scholarly and creative endeavors. Honesty and integrity are prerequisites of this freedom. Academic honesty in the advancement of knowledge requires that all students and instructors respect the integrity of one another's work and recognize the importance of acknowledging and safeguarding intellectual property.

Academic dishonesty is a serious violation of the trust upon which an academic community depends. The College Academic Honesty Policy is both an articulation of the kinds of behaviors that violate this trust and the means by which that trust is safeguarded and restored. For further information on the University of Rochester Policy on Academic Honesty, please visit the following website:

https://www.rochester.edu/college/honesty/

ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES: Students needing academic adjustments or accommodations because of a documented disability must contact the Disability Resource Coordinator for the school in which they are enrolled:

http://www.rochester.edu/eoc/DisabilityCoordinators.html